

CLAIMS

1. A frame relay device, comprising:

a table for registering an entry containing a pair of a MAC address and an IP address used in a process of relaying a frame in the frame relay device itself;

judging unit for searching through the table for a source MAC address and a source IP address in a received frame to judge whether or not the pair of the source addresses is registered as a relay object at a layer 3; and

layer 3 relay processing unit for performing a layer 3 relay process only for a frame judged as containing the pair of the source addresses registered as the relay object.

2. The frame relay device according to claim 1, further comprising relay object registering unit for: transmitting a query frame for querying whether or not the pair of the source addresses is normal if the pair of the source addresses of the frame is not registered in the table; judging whether or not a condition that a reply frame to the query frame is received within a predetermined time after the transmission of the query frame and a condition that information in the reply frame indicates that the pair of the source addresses is normal are satisfied; registering an entry containing a pair of source addresses satisfying the conditions in the table; and excluding a pair of source addresses failing to satisfy the

conditions from an object to be registered in the table.

3. The frame relay device according to claim 2, wherein the relay object registering unit transmits an ARP request frame for querying a MAC address corresponding to the source IP address of the frame as the query frame to receive an ARP reply frame as the reply frame and judges that the combination of the source addresses is normal when the MAC address of a query destination in the ARP reply frame is identical with the source MAC address of the frame.

4. The frame relay device according to claim 2, wherein the relay object registering unit transmits a ping frame containing the source MAC address and the source IP address of the frame respectively as a destination MAC address and a destination IP address as the query frame to receive a ping reply frame as the reply frame and judges that the combination of the source addresses is normal when the source MAC address and the source IP address of the ping reply frame are respectively identical with the source MAC address and the source IP address of the frame.

5. The frame relay device according to any one of claim 2, wherein the relay object registering unit excludes the pair of the source addresses of the frame from an object to be registered in the table regardless of whether or not the conditions for the reply

frame are satisfied when an entry containing the same IP address as the source IP address of the frame is already registered in the table.

6. The frame relay device according to any one of claim 2, wherein the relay object registering unit excludes the pair of the source addresses of the frame from an object to be registered in the table regardless of whether or not the conditions for the reply frame are satisfied when an entry containing the same MAC address as the source MAC address of the frame is already registered in the table.

7. The frame relay device according to any one of claims 2, wherein:

a registerable number of entries having the same MAC address and a different IP address in the table is predefined; and

wherein the relay object registering unit excludes the pair of the source addresses of the frame from an object to be registered in the table regardless of whether or not the conditions for the reply frame are satisfied when the number of entries equal to or larger than the registerable number, each containing the same MAC address as the source MAC address of the frame, are already registered in the table.

8. The frame relay device according to any one of claim 1, wherein the table stores an entry containing a MAC address and a destination port number corresponding to the MAC address and is constituted by providing a field of an IP address corresponding to the MAC address and a field for storing information indicating whether or not it is a relay object for each entry of the MAC address table referred to so as to find a destination port in the layer 2 relay of a frame,

the frame relay device further comprising:

layer 2 relay processing unit for referring to the table to perform the layer 2 relay process of a frame received by the frame relay device itself; and

deleting unit for deleting an entry unused for a given period of time from the table.

9. The frame relay device according to claim 8, wherein, when an entry containing the pair of the source addresses of the frame is to be registered in the table, if another entry containing the same MAC address as the MAC address forming the pair of the source addresses is already registered in the table, the entry is registered so as to be found in a search prior to the another entry in a process executed by the judging unit.

10. The frame relay device according to any one of claim 1,

wherein the frame relay device is configured to be capable of setting whether or not the processes executed by the judging unit and the relay object registering unit are performed for each port included in the frame relay device itself.

11. A framed relay device, comprising:

a table capable of registering only one receivable MAC address for each port included in the frame relay device itself;

judging unit for judging, for a frame received at each port, whether or not a pair of the same MAC address and the same port number as a pair of a source MAC address and a receiving port number of the frame is registered in the table; and

relay unit for performing a layer 2 relay process only for a frame containing the pair of the source MAC address and the receiving port number judged as being registered.

12. The frame relay device according to claim 11, further comprising a MAC address learning section for judging whether or not the pair of the source MAC address and the receiving port number is valid to register a valid pair of a source MAC address and a receiving port number in the table when the source MAC address of the frame is not registered in the table.

13. The frame relay device according to claim 12, wherein the

MAC address learning section registers a pair of a source MAC address and a receiving port number of a frame first received after the port is brought into a frame receivable state as the valid pair in the table.

14. The frame relay device according to claim 11, wherein the MAC address learning section is capable of setting for each port number whether or not to judge validity of the pair of the source MAC address and the receiving port number.

15. A frame judging device, comprising:
a table capable of registering only one receivable MAC address for each port included in the frame judging device itself; and
judging unit for judging, for a frame received at each port, whether or not a pair of the same MAC address and the same port number as a pair of a source MAC address and a receiving port number of the frame is registered in the table.

16. A frame judging device, comprising:
a table for registering an entry containing a pair of a MAC address and an IP address used in a process of relaying a frame in the frame judging device itself; and
judging unit for searching through the table for a source MAC address and a source IP address in a received frame to judge

whether or not the pair of the source addresses is registered as a relay object at a layer 3.